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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,580	04/11/2001	Michael Donovan Mitchell	8493	3614

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 03/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/832,580

Applicant(s)

MITCHELL ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Interpretation

1. The terms "coating add-on" and "carbon add-on" at the differing stages of claims 7-9 have been interpreted in accordance with the specification at pp. 10-12.
2. The units on the pore volumes of claim 13 "mL/g" have been interpreted in accordance with the specification on p. 13 to mean "mL/g carbon in the activated coating".

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant defines the term "filter particle" as "an individual member or piece which forms at least part of a filter material" (p. 5, lines 28-30). The definition appears to exclude screens and woven or non-woven fabrics, which are made of more than one member, but claim 5 states that the term includes screens and woven or non-woven fabrics (see next sentence). The discrepancy between the claims and specification renders the claim unclear. There appears to be a word missing after "woven" and "non-woven". Based on the prior art (e.g., Economy '114, col. 3, lines 25-26), the examiner has assumed that applicant means "a woven fabric" and "a nonwoven fabric". For the purposes of applying art, claim 5 has been treated as including the possibility that the filter particle is present in the form of a screen or woven or non-woven fabric.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-2 and 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Economy et al. (U.S. Patent 5,834,114, hereafter '114) in view of Buzzelli (U.S. Patent 3,650,834, hereafter '834).

Claim 1 requires "A process for forming a filter material comprising the steps of:

- a) coating a filter particle with a coating comprising a lignosulfonate;
- b) carbonizing said coating; and
- c) activating said coating."

Economy '114 teaches a method for forming a filter material (col. 1, lines 11-13) comprising the steps of:

- a) coating a fiber with a carbonizable precursor coating (col. 2, lines 49-55). (The fiber must be a filter particle because a filter is produced (col. 1, lines 11-13). Furthermore, the fiber may be a glass fiber (col. 3, lines 23-26), which applicant states is a filter particle in claim 4.);
- b) carbonizing said coating (col. 2, lines 53-54); and
- c) activating said coating (col. 2, lines 54-55).

Economy '114 does not teach that the carbonizable precursor is a lignosulfonate. However, '114 is open to the use of other materials that will produce carbonizable coatings (col. 3, lines 8-15). Buzzelli '834 teaches the formation of an activated carbon electrode, which is formed by charring (i.e., carbonizing) and activating a lignosulfonate (col. 1, line 66-col. 2, line 16). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the lignosulfonate of Buzzelli '834 as the carbon precursor in place of the phenolic resin of Economy '114 with a reasonable expectation of success and with

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the expectation of similar results because Economy '114 is open to the use of other activated carbon precursors and because Buzzelli '834 recognizes lignosulfonates as operable carbon precursors.

Claim 2: Buzzelli '834 teaches that the lignosulfonate is sodium lignosulfonate (col. 2, lines 11-13).

Claim 4: Economy '114 teaches that the filter particle may be a glass fiber (col. 3, lines 23-27).

Claim 5: Economy '114 teaches that the filter particles may be woven fabrics (col. 3, lines 23-27; Example 1: col. 5, lines 1-14).

Claim 6: Economy '114 teaches drying the coating when applied as a solution (col. 3, lines 32-35; Example 1: col. 5, lines 9-10).

Claims 7-8: Economy '114 teaches that the cured (i.e., carbonized; see col. 3, lines 35-38) carbon add-on is 22-35% (Table I). Although Economy '114 does not appear to explicitly teach values of the coating add-on before carbonization, col. 3, lines 35-38 suggest that the amount of coating that is volatilized during the carbonization should be a minimum. Thus, Economy '114 suggests that the coating add-on before carbonization should be approximately the same as the carbon add-on in the carbonized coating.

Claim 9: In Example II, Economy '114 teaches the use of 0.6-0.9 g of substrate material (col. 5, lines 63-67). The weight of the activated coating may be determined from the information in Table II (original resin weight-weight loss), and ranges from 0.081-0.133 g. Thus, the examples necessarily teach that the coating add-on in the activated coatings of Example II are between 8 and 19%.

Claim 10: Buzzelli '834 teaches charring the lignosulfonate below about 600 °C (col. 2, lines 1-2). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

Claim 11: Economy '114 suggests activation temperatures of 600-800 °C (Example II).

Claim 12: Economy '114 teaches BET surface areas of 710-1245 m²/g (Table III).

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8. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Economy '114 in view of Buzzelli '834, as applied to claim 1, above, and further in view of Buelow et al. (U.S. Patent 6,006,797, hereafter '797).

'114 and '834 are discussed above, but do not explicitly teach that the sum of mesopores and macropores specific volumes is between 0.2-2.2 mL/g or a volume ratio of (mesopores + macropore)/micropore of between 0.3 and 3.

However, '114 teaches that the properties of the activated-carbon coated fibers may be tailored to adsorb a wide variety of contaminants (col. 2, lines 28-30) and that the pores of desired size may be obtained (col. 4, lines 18-25).

'797 teaches the formation of activated carbon compositions from carbonizable precursors, wherein the compositions are designed to adsorb acetylene (col. 7, lines 19-67). Example 5 teaches that the adsorption of acetylene may be made reversible by using activated carbon compositions with a specific micropore volume of 0.6 mL/g, a specific mesopore volume of 0.9 mL/g, and a specific macropore volume of 0.15 mL/g (Example 5: col. 10, lines 62-68). (Note: A cubic centimeter is equivalent to a milliliter.) Thus, '797 teaches that the sum of mesopores and macropores specific volumes is 1.05 mL/g and the volume ratio of (mesopores + macropore)/micropore is 1.75. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of '114 and '834 to have created an activated carbon with a sum of mesopore and macropore specific volumes of 1.05 mL/g and a volume ratio of (mesopores + macropore)/micropore of 1.75 because '114 teaches that the properties of the activated carbon film may be modified for the adsorption of different chemical species and because '797 teaches that such values are specifically useful in the adsorption of acetylene.

Allowable Subject Matter

9. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not fairly teach or suggest the use of filter particles with activated

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carbon coatings that cover less than the complete surface, as described by Applicant on p. 8 and claimed in claim 3.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gadkaree (U.S. Patent 5,487,917), Gadkaree (U.S. Patent 5,597,617), and Hickman (U.S. Patent 6,372,289) are cited for their teachings regarding coating substrates by applying carbon precursors, carbonizing, and activating the carbon coatings.

Kovach (U.S. Patent 3,864,277) and Metcalfe, III et al. (U.S. Patent 3,811,947) are cited for their teachings regarding forming activated carbon by carbonizing lignosulfonates and then activating the carbon.

Peng et al. (U.S. Patent 6,024,899) and Tolles et al. (U.S. Patent 5,204,310) are cited of interest for their teachings regarding pore size distributions in activated carbon coatings.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 8-5:30 M-F, with alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Michael Cleveland
Patent Examiner
March 13, 2003